

What is claimed is:

1. A process of producing a circularly-polarized-light-separating element, comprising:

a first step of applying, to a substrate having alignment power, a cholesteric liquid crystal solution prepared by dissolving a radiation-polymerizable cholesteric liquid crystalline material in a solvent, thereby forming a film;

a second step of removing the solvent from the film formed in the first step, thereby obtaining an uncured cholesteric liquid crystal film; and

a third step of applying, for curing, radiation to the uncured cholesteric liquid crystal film formed in the second step, while holding a phase of this film to a supercooled cholesteric one, thereby obtaining a cured cholesteric liquid crystal film.

2. The process according to claim 1, wherein, in the third step, the phase of the uncured cholesteric liquid crystal film formed in the second step is held to a supercooled cholesteric one with liquid crystalline molecules in planar orientation.

3. The process according to claim 1, wherein, in the third step, the uncured cholesteric liquid crystal film formed in the second step is held at a temperature that is 30 - 90°C lower than a lower limit of a temperature range in which liquid crystalline molecules in the liquid crystal film form a non-supercooled cholesteric phase.

4. The process according to claim 1, further comprising, between the second and third steps, a fourth step of leaving, as it is, the uncured cholesteric liquid crystal film formed in the second step for a predetermined period of time so that the phase of this film is brought to a supercooled cholesteric one with liquid crystalline molecules in planar orientation.

5. The process according to claim 4, wherein, in the fourth step, the uncured cholesteric liquid crystal film

formed in the second step is heated.

6. The process according to claim 1, further comprising:

a fifth step of applying, to the cured cholesteric liquid crystal film formed on the third step, an additional cholesteric liquid crystal solution prepared by dissolving a radiation-polymerizable cholesteric liquid crystalline material in a solvent, thereby forming an additional film;

a sixth step of removing the solvent from the additional film formed in the fifth step, thereby obtaining an uncured additional cholesteric liquid crystal film; and

a seventh step of applying, for curing, radiation to the uncured additional cholesteric liquid crystal film formed in the sixth step, while holding a phase of this film to a supercooled cholesteric one, thereby obtaining a cured additional cholesteric liquid crystal film.

7. The process according to claim 6, wherein, in the third and seventh steps, the phases of the uncured cholesteric liquid crystal films respectively formed in the second and sixth steps are held to supercooled cholesteric ones with liquid crystalline molecules in planar orientation.

8. The process according to claim 6, wherein, in the third and seventh steps, the uncured cholesteric liquid crystal films respectively formed in the second and sixth steps are held at temperatures that are 30 - 90°C lower than lower limits of temperature ranges in which liquid crystalline molecules in the liquid crystal films form non-supercooled cholesteric phases.